Impact of Encroachment on Military Training Quality

A Framework and Methodology for Establishing Degraded Military Skills Due to Encroachment of Training Ranges

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Study Objective

Create a methodology that determines the contribution and significance of encroachment and training workarounds to degraded mission skills.

Reviewed Previous Efforts

- Skills Based Training (CNA)
- Camp Pendleton (USMC and SRA)
- SAF/IE Capacity Analysis (BAH)
- ATTAC & ISR Enhancements (Army DCSOPS/G3)
- Navy Range Needs Assessment -- Air to Ground Ranges (N44)
- PACFLEET Encroachment Matrix (N433)

Review Findings

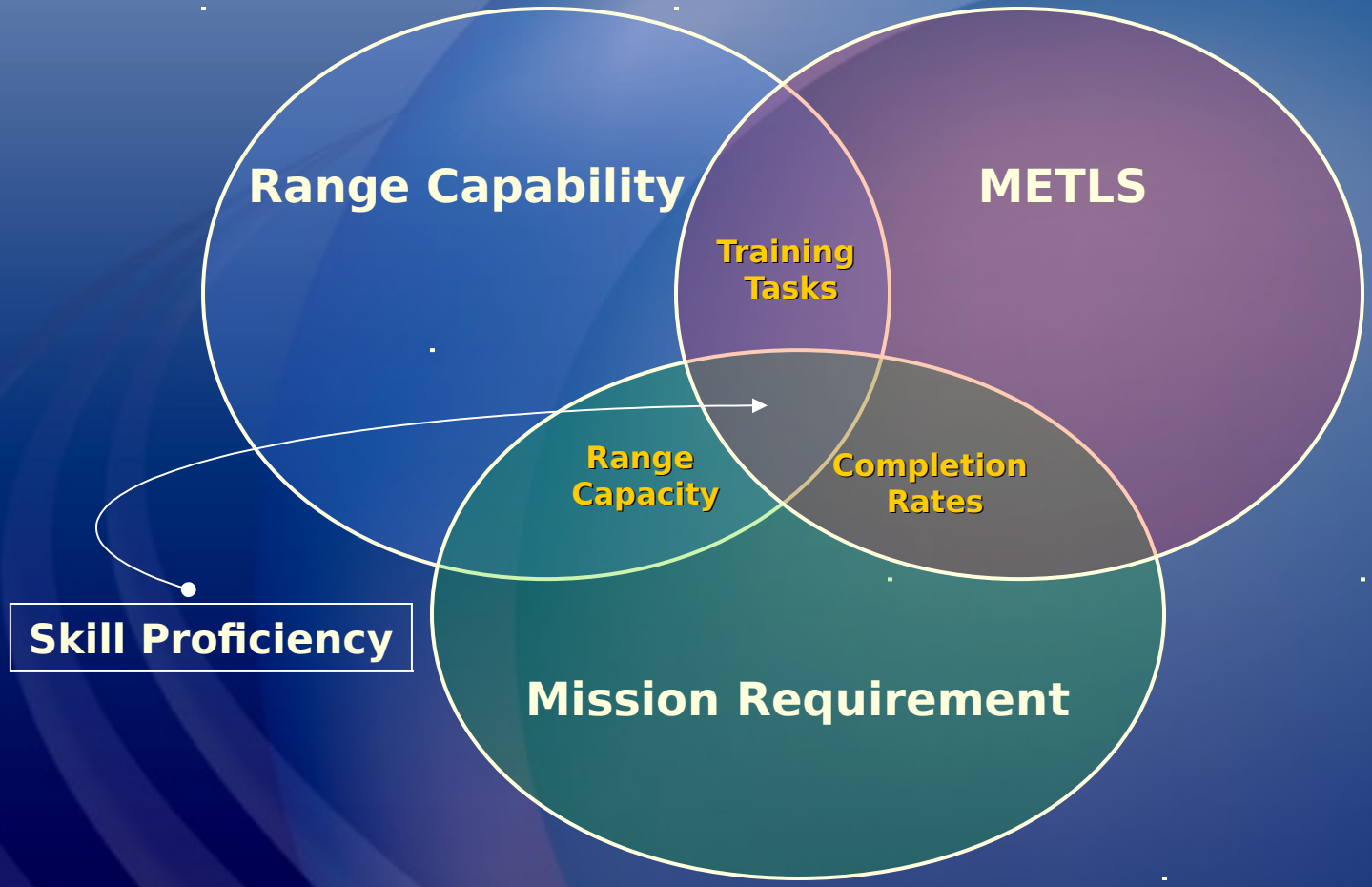
- **Training Range and Facility Impact Analysis Methodologies…**
  - Focus on resource optimization (i.e., capacity analysis) and constraints on full/effective use
  - Link Encroachment to Training Facility Mission
  - May not directly address effect of Encroachment on Training Quality
  - Encroachment Effect measured by Percentage of Land Available or Maps of Usable Facility, etc.

- **Readiness Impact Analysis Methodologies …**
  - Tie Location to a Training Requirement (Mission Essential Task)
  - Link Encroachment to Readiness Rating
  - May not directly link a Readiness Rating to a Specific Range
  - May not address the significance of an encroachment factor on a Readiness Rating

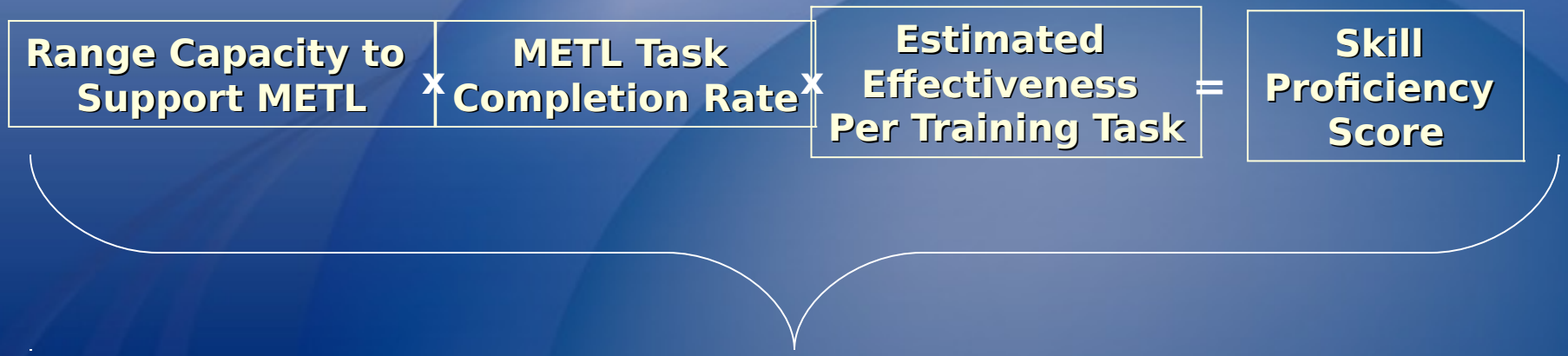
To meet our objective both methodologies needed to be harmonized and enhanced

Developed a Conceptual Framework

Assumption: Encroachment Limits Capacity and Forces Workarounds that Negatively Impact Training and Results in Degraded Skill Proficiency



Conceptual Model



Impacted Training Proficiency

Concept Elements

1. **Identify**
   - **Specific Combat Missions**
   - **Combat Units and their Training/OPAREAs**
   - **Unit METLs**

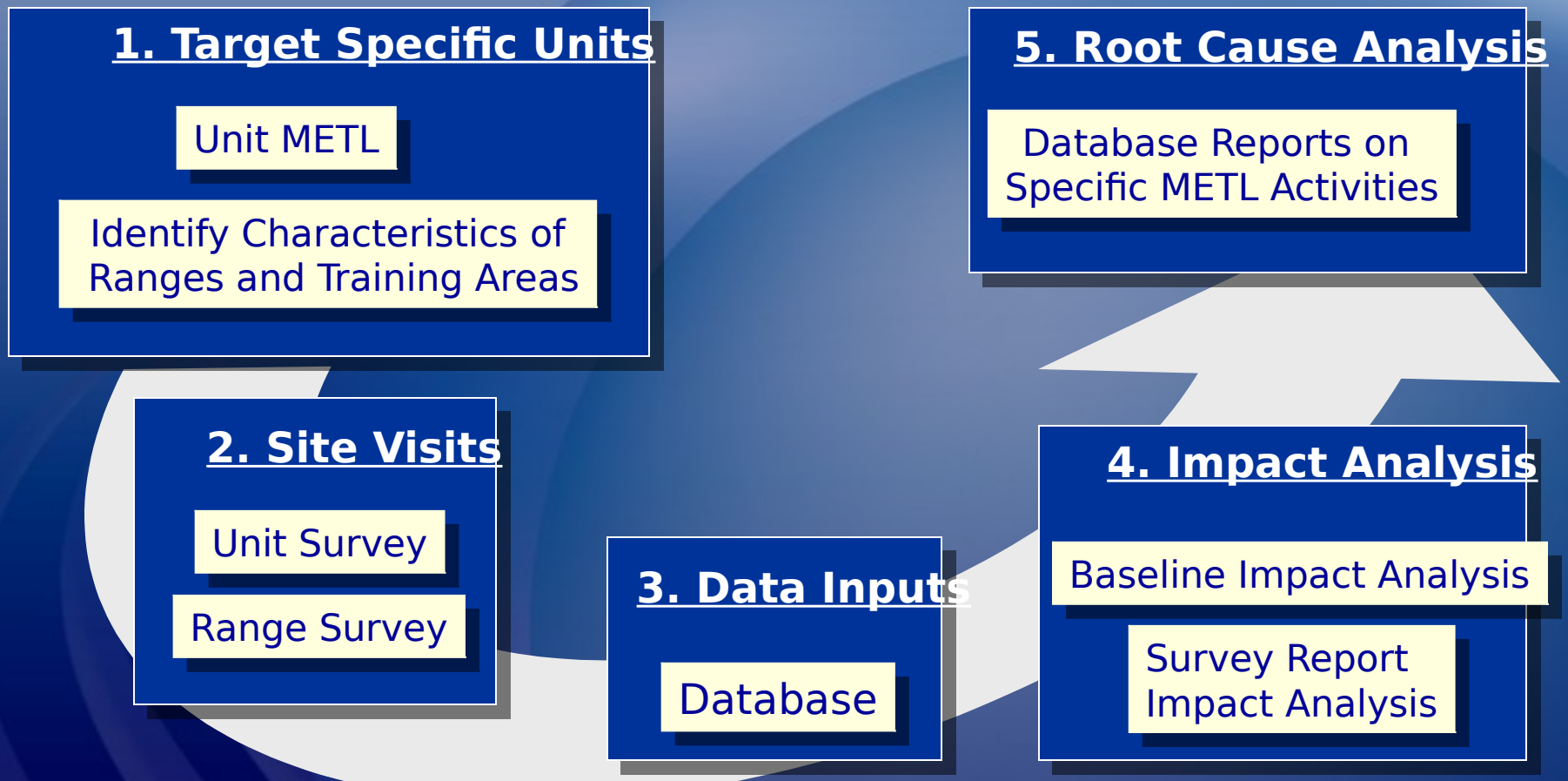
2. **Obtain Data**
   - **Interview Units based at specific installations and OPAREAs**
   - **Interview OPAREA and Training Range managers**
   - **Relate contribution of conditions to training and skill acquisition performance**
     - **Internal (logistics, schedules, certifications, etc.)**
     - **External (weather, deployment, encroachment, safety)**

Concept Elements (concluded)

3. Analyze
   - Calculate proficiency impacts
   - Perform comparative impact analyses
   - Determine root causes of skill proficiency impacts
   - Identify options to mitigate the impact of root causes on skill proficiency

4. Correct
   - Determine which root cause factors should be addressed locally, regionally, or nationally
   - Assign responsibility for corrective action

Five Step Methodology for Concept Validation



Concept Validation Field Study
Step 1: Target Specific Units

- Surveyed Navy F-14B (Tomcat) Carrier Air Wing Fighter Squadron and managers of the Squadron's training ranges
  - Naval Auxiliary Landing Field (NALF), VA
  - Dare County Bombing Range, NC
  - TACTS ranges comprising Virginia Capes, MD, VA, NC
  - Fallon Range Training Center
- Four core mission skill sets analyzed
  - Mobility
  - Strike warfare
  - Anti-air warfare
  - Amphibious warfare
- Each mission has a defined number of tasks for training

Concept Validation Field Study
Step 2: Data/Information Collection

- Surveys
  - Range-specific Questionnaire
    - Given to range managers, environmental staff, logistics personnel, training event planners
    - 27 questions focused on range characteristics, encroachment present, knowledge of training workarounds
  - Unit-level Questionnaire
    - Given to unit commanders and unit training officers
    - 16 questions focused on training to task, supplemental training, and training effectiveness

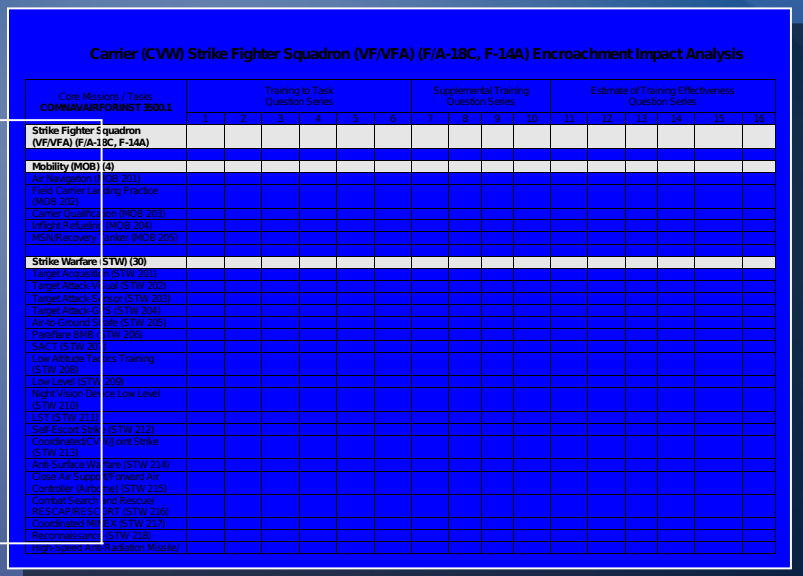
Concept Validation Field Study
Step 3: Data Inputs

Generic Survey with METL-specific Responses

Interview specific to selected Mission Training activities [COMNAVAIRFORINST 3500.1 and COMNAVSURFORINST 3502.1]

Example: VF/VFA (F/A-18C, F14A)

- Mobility
- Strike Warfare
- Antiair Warfare
- Amphibious Warfare
- Antisurface Warfare
- Mine Warfare



Carrier (CVW) Strike Fighter Squadron (VF/VFA) (F/A-18C, F-14A) Encroachment Impact Analysis

Core Missions / Tasks COMNAVAIRFORINST 3500.1	Training to Task Question Series						Supplemental Training Question Series				Estimate of Training Effectiveness Question Series					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Strike Fighter Squadron (VF/VFA) (F/A-18C, F-14A)																
Mobility (MOB) (4)																
Air Navigation (MOB 201)																
Field Carrier Landing Practice (MOB 202)																
Carrier Qualification (MOB 203)																
Inflight Refueling (MOB 204)																
MSN/Recovery Tanker (MOB 205)																
Strike Warfare (STW) (30)																
Target Acquisition (STW 201)																
Target Attack/CVW Joint (STW 202)																
Target Attack/Surveillance (STW 203)																
Target Attack/GCI (STW 204)																
Air-to-Ground Missile (STW 205)																
Paraflare BMB (STW 206)																
SACT (STW 207)																
Low Altitude Tactics Training (STW 208)																
Low Level (STW 209)																
Night Vision Device Low Level (STW 210)																
LST (STW 211)																
Self-Escort Strike (STW 212)																
Coordinated/CVW Joint Strike (STW 213)																
Anti-Surface Warfare (STW 214)																
Close Air Support/Forward Air Controller (Airborne) (STW 215)																
Combat Search and Rescue/ RESCAP/RESCORT (STW 216)																
Coordinated Mine Ex (STW 217)																
Reconnaissance (STW 218)																
High-Speed Anti-Radiation Missile/																

Responses captured and entered into a database for analysis

Concept Validation Field Study Training

Step 4: Impact Analysis

Training Quality Impact Analysis Tool Populated with Field Study Data

Mission Type for CVW Fighter Squadron (F-14B)	Actual Range Complex Capabilities (a)	Required Range Capabilities (b)	Range Capability Index (a/b)	Tasks Completed (c)	Total METL Tasks (d)	Task Completion Index (c/d)	Encroachment Factors Impacting Training (e)	Total Encroachment Factors Present (f)	Encroachment Impact Index (e/f)	Actual Effectiveness Score (h)	Maximum Effectiveness Score (i)	Effectiveness Index (h/i)	Impacted Training Quality Score (z)
Mobility: Baseline	3	4	0.75	5	5	1.00	1	2	0.5	40	40	1.000	27
Mobility: Survey Responses	3	4	0.75	4	5	0.80	4	7	0.6	33	40	0.825	24
Strike Warfare: Baseline	8	13	0.62	19	19	1.00	1	3	0.3	128	128	1.000	49
Strike Warfare: Survey Responses	8	13	0.62	1	19	0.05	3	8	0.4	16	128	0.125	103
Amphibious Warfare: Baseline	1	1	1.00	1	1	1.00	1	3	0.3	8	8	1.000	30
Amphibious Warfare: Survey Responses	1	1	1.00	1	1	1.00	1	3	0.3	8	8	1.000	30

- An algorithm is used to calculate “scores” for baselined and survey reported METL performance data to enable variance analysis
- Similar scores for Baselined and Reported METL performance indicates training/workarounds are successful
- Dissimilar scores for baselined and reported METL performance indicates proficiency issues; requires Root Cause analysis.
- “Strike Warfare” example above illustrates which scores need root cause analysis

Concept Validation Field Study:
Step 5: Root Cause Analysis via Database

- **Allowed trace-back to main root causes**
  - Munitions use restrictions
  - Inadequate physical conditions
  - Inadequate training facility

- **Analysis revealed specific reasons for lower-than-expected training proficiency skills and task completion rates in strike warfare**
  - Physical ability of the range or training area to accept additional increases in user demand (capacity constraints)
  - Training airspace corridors (private and commercial encroachment)
  - Restrictions on munitions use due to resources need to clean or clear material from the ranges (safety concerns, fire hazards, ESA)
  - Electronic equipment and general safety (logistics supply)
  - Hours of operation restrictions (community issues with noise)

Project Conclusions

1. Field study validated concept and methodology
2. Identified specific impacts from encroachment vs. range capacity constraints
3. Method able to identify root causes of degraded training
4. Effort builds on capacity analysis models of encroachment:
   - Uses existing data from range inventory
   - Uses official Service METLs or training instructions to baseline proficiency requirements against actual training results
   - Integrates mission training impacts (delayed, modified, relocated, cancelled) with encroachment pressures
5. Identifies encroachment impact on specific training activities to help mitigation actions and investment decisions

For Copies of the Full Report:

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